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(54) Sheet material handling system, and dispenser and winding apparatus for use therein.

(57) A dispenser for plastics film material comprises a base (10) with a handle (12). A mandrel assembly (16) is removably fitted in a socket (14) on the base (10), and includes a central part (22) holding a reel (24) of film. The central part (22) is rotatable with respect to the remainder of the assembly (16) to allow the film (24) to unreel. Adjustable braking means are provided to give a preselected degree of resistance to unreeling.

The dispenser forms part of a packaging system which also includes a winding apparatus

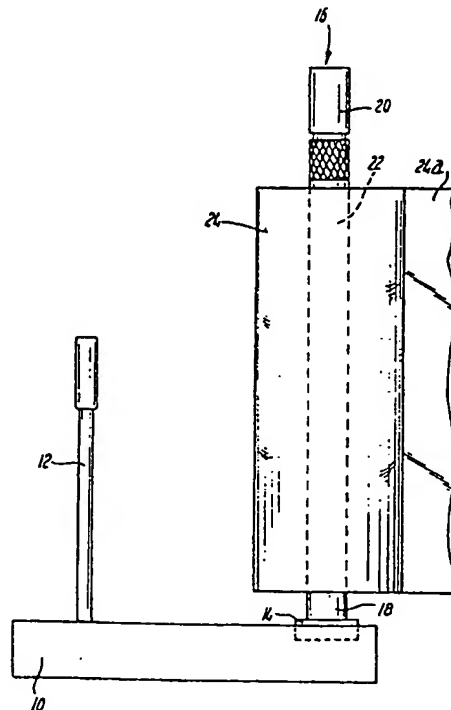


Fig. 1

EP 0 300 695 A2

"Sheet Material Handling System, and dispenser and winding apparatus for use therein"

This application relates to a system for handling sheet materials in roll form, and particularly (but not exclusively) plastics stretch film; and to a dispenser and a winding apparatus for use in the system.

Plastics stretch film is widely used in industry as a means of packaging material loaded on pallets. The plastics material is supplied on large bulk rolls which has to be converted onto small rolls before use. On application, the plastics should be stretched so that it wraps tightly against the material being packaged.

A number of problems exist for the average user. The machine required for converting the plastics film from large bulk rolls to the smaller rolls is too expensive for most users who thus have to buy in the smaller rolls already converted. This increases cost because of the need to pay for the conversion to be carried out. It also introduces the possibility of wastage as the nature of the plastics film is such that it is extremely difficult to tell if the small roll has a shorter length of film on it than specified. A further problem is that when the plastics film is used in packaging by hand it may be inadequately stretched which has the effect of providing a less secure package than is possible and also leads to a certain amount of wastage.

Accordingly, the present invention in one aspect provides apparatus for dispensing sheet material from a roll, comprising a generally cylindrical body having a first portion for mounting said roll, and a second portion extending therefrom; the first and second portions being arranged for relative rotational motion; and means being provided for resisting said relative rotation.

This allows wrapping by hand with a controlled tension and thus a controlled degree of stretch.

Preferably, means are provided for adjusting the degree of resistance.

From another aspect, the invention resides in an apparatus for use in winding plastics material films onto a reusable and/or tensionable core, comprising means for receiving a bulk roll of film for rotation, means for receiving the reusable and/or tensionable core onto which the film is to be wound, and means being provided for driving the core for winding the film thereon.

Further the invention provides a system for handling sheet materials supplied in bulk roll form, comprising a plurality of cores, an apparatus in accordance with the preceding paragraph for winding the material from the bulk roll onto said cores in shorter lengths, and one or more dispensers for dispensing material from the cores under controlled tension.

Said core may be a reusable sleeve for mounting on a dispensing apparatus as defined above, or may be constituted by that apparatus itself.

The handling system of the invention allows a small user to combine hand wrapping with bulk supply in an economical manner.

Embodiments of the invention will now be described, by way of example only, with reference to the drawings, in which;

Fig. 1 is a side view of a dispenser forming one embodiment of the invention ready for use;

Fig. 2 is a detailed cross-sectional side view of a mandrel assembly forming part of the dispenser of Fig. 1;

Figs 3 and 4 are cross-sectional side views illustrating alternative forms of mandrel assembly;

Fig. 5 is a schematic side view of one embodiment of winding apparatus in accordance with the present invention; and

Fig. 6 is a side view illustrating the path taken by the film through the winding apparatus.

Referring to Fig. 1, the dispenser comprises a base 10 having an upstanding handle 12 by means of which the dispenser can be moved by a user. The base is provided with a socket 14 in which a mandrel assembly designated generally at 16 can be removably fitted. The mandrel assembly 16 includes a bottom section 18 for securement in the socket 14, a handle portion 20 at the opposite end, and a central part 22 on which is reeled a plastics stretch film 24. As will be described, the central part 22 is rotatable with respect to the remainder of the mandrel assembly 16 but such rotation is restrained by a variable braking force; this allows the film 24 to be unreeled as indicated at 24a with a chosen degree of tension.

The mandrel assembly 16 is shown in detail in Fig. 2. A shaft 26 runs centrally of the assembly. The handle portion 20 comprises a tubular member 28 rotatable with respect to the shaft 26 by means of bearing bushes 30, 32 mounted in end cap 34 and spacer 36. The bottom portion 18 comprises a tubular member 36 rotatable with respect to the shaft 26 via bearing bush 38 mounted in end cap 40. A shaft support 42 and a steel bolt member 44 (to be discussed below) are bonded to the tubular member 36.

The central part 22 of the mandrel assembly 16 comprises a tubular member 46, on which the film (not shown) is reeled, mounted for rotational and axial movement with respect to the shaft 26 by bearing bushes 48 via spacers 50, 51. The spacers have rings of friction braking material 52, 53 secured to their axially outer faces.

Manually operable tension adjusting means,

designated generally at 54 and 56, are provided on either side of the central part 22.

The first tension adjusting means 54 comprises an externally knurled ring 58 bonded to a cap-shaped steel thrust nut 60 which is internally threaded to engage an external thread of the bolt member 44. The bolt member 44 is fast with the shaft 26 by means of a lock pin 62. A set of spring washers 64 is trapped between the end face of the thrust nut 60 and a thrust pad 66 bearing against the friction ring 53. The thrust pad 66 is axially slidable on the shaft 26 but is restrained from rotation on it by a dowel pin 68 engaging in slots in the thrust pad 66.

The second tension adjusting means 56 comprises an externally knurled ring 70 bonded to a steel insert 72 and to a steel thrust pad 74 against which the friction ring 52 bears. The insert 72 is fast with shaft 26 by means of a lock pin 76 thus preventing rotation and axial movement of the assembly 70, 72, 74 with respect to the shaft 26.

Thus, rotation of the knurled ring 58 causes axial movement of the thrust nut 60 with respect to the shaft 26 to alter the axial length of the spring washers 64 and hence the axial force applied to the friction rings 52, 53 to alter the rotational resistance of the central part 22. This can equally be adjusted by rotating the knurled ring 70 which causes rotation of the shaft 26 with respect to the handle and bottom portions 18, 20 which in turn rotates the bolt member 44 to produce axial movement of the thrust nut as before.

It will be understood that the mandrel assembly of Fig. 2 may in fact be fitted to the base in either direction.

Referring now to Fig. 3 of the drawings, another embodiment of mandrel assembly is in the form of a cylindrical body shown generally at 101 comprising a first handle portion 102, a second dispensing portion 103 and a third adjuster portion 104. A central axle 105 is fixed to an end plate 106 of the handle portion 102 and extends through bearing plates 107, one at the opposite end of the handle portion 107, one at each end of the dispenser portion 103 and one at one end of the adjuster portion 104 to a support plate 108 at the opposite end of the adjuster portion 104.

A sleeve 109 is fitted over the axle 105 and keyed to it at 110. The sleeve 109 has a threaded end portion 111 which extends into the adjuster 104 and is engaged by an adjustment nut 112 which is fixed to the adjuster 104.

A lever 113 to which a brake pad 114 is attached pivots on the axle 105 at 115 and extends through an aperture in the sleeve 109. A portion of the sleeve 109 forms a cam 116 which engages the lever 113. A spring 117 is fixed on the sleeve 109 and urges the lever 113 against the cam 116.

In use a quantity of sheet material such as plastics stretch film is wound onto the dispensing portion 103. A user can then unwind the material from the dispensing portion 103 and wrap it around a package to be wrapped. The mandrel assembly may be used with the base 10 of Fig. 1. Alternatively, the user may hold the assembly by the handle portion 102 and the dispensing portion 103 rotates on the axle 105 to unwind the material. However, the brake pad 114 resists the rotation of the dispensing portion 103 and thus the material is tensioned as it is unwound and, in the case of plastics stretch film, stretched. The degree of resistance presented by the brake pad 114 can be adjusted by rotating the adjuster 104 which causes the adjuster nut 112 to rotate on the threaded end portion 111 of the sleeve 109 which thus moves along the axle 105 to cause the cam 116 to move against or away from the lever 113. This causes the brake pad 114 to bear more or less against the dispensing portion 103.

Another alternative embodiment is illustrated in Fig. 4. This embodiment is essentially similar in function to the embodiment of Fig. 3 and like parts are accorded like reference numerals. This embodiment, however, is designed to accommodate a quantity of sheet material which has already been wound onto a tubular former 118. In this case the dispensing portion 103 is modified to receive this former 118 by substituting two of the bearing plates 107 with retaining plates 119 and 120 which each have a wedge portion 121 which engages the former 118 to retain it on the dispensing portion 103. The plate 120 can be threaded onto the dispensing portion 103 the desired amount to grip the former 118 and the plate 119 is removable for initial fitment of the former 118.

Thus this mandrel assembly can be used with already converted rolls of material rather than being wound direct from a bulk roll.

Although the primary use of the dispenser is for dispensing plastics stretch film packaging material it can be adapted for many other uses.

Many other types of plastics material can be dispensed from the dispenser and it is envisaged, for example, that cling type film as sold in supermarkets and the like could be dispensed from the dispensers if provided with suitable fixings. A shopper could thus obtain any desired length of cling film.

Figs 5 and 6 illustrate a winding apparatus which can be used to wind film from a bulk roll onto mandrel assemblies such as those shown in Figs 2 to 4 or onto formers such as former 118 of Fig. 5.

The winding apparatus comprises a box like casing 201 which has a front closure member 202 hinged to the casing 201 at 203. A support 204 is

provided in the base of the casing 201 for receiving a bulk roll 205 of plastics material pallet wrap film. The support 204 may be slid out of the front of the casing 201 for replacement of the bulk roll 205.

An intermediate roller 206 is mounted in the casing 1 above the bulk roll 205.

A ledge 207 in the casing 201 has a pair of supports 208 for receiving a core 209 onto which film is to be wound. This core 209 is preferably of a reusable and/or tensionable type, as described above.

A pair of retaining members 210 provided with handles are pivotally mounted in the casing 1 and serve to retain the core 209 in position. A micro-switch, not illustrated, is provided and one of the retaining members 210 operates it to stop the operation of the apparatus when the core 209 and associated film reaches a desired size. A lid 211 is also provided on the casing 201 and serves to cover the core 209 in the closed position.

Drive means, in the form of an electric motor (not shown), are provided for the core 209 and an operating switch is provided on the top of the casing 201.

In use a bulk roll 205 of film is located in the apparatus and the film is passed over the intermediate roller 206 to lie on the ledge 207. A core 209 is sited on the supports 208 and retained by the retaining members 210. The end of the film is then wrapped partially around the core 209 and the front closure member 202 and lid 211 closed. The operating switch is then operated and the apparatus commences operation to wind the film onto the core 209. The diameter of the core 209 increases until the microswitch is operated to stop the machine.

The lid 21 can then be opened and the film cut to allow the now full core 209 to be removed.

This core 209 is then available for use in packaging materials using the film. While this first core 209 is being used further cores 209 can be prepared in the same fashion.

The apparatus is provided with various safety cut out devices to prevent operation when the closure member 202 and lid 211 are not closed. In addition the lid 211 cannot be closed until the retaining members 210 are correctly positioned.

Modifications and improvements may be incorporated without departing from the scope of the invention.

Claims

1. Apparatus for dispensing sheet material from a roll, comprising a generally cylindrical body having a first portion for mounting said roll, and a second portion extending therefrom; the first and

second portions being arranged for relative rotational motion; and means being provided for resisting said relative rotation.

2. Apparatus according to claim 1, in which said resisting means includes means for adjusting the degree of resistance.

3. Apparatus according to claim 2 in which the first portion is rotatable on a shaft, the second portion is secured to the shaft, and the resisting means comprises a brake extending from the shaft to engage the first portion, the adjustment means being in the form of a lever and cam arrangement.

4. Apparatus according to claim 2, in which the first portion is rotatable on a shaft, the second portion is secured to the shaft, and the resisting means comprises a brake formed between a first annular member secured to said first portion and a second annular member rotating with the shaft, resilient means being provided for urging the first and second annular members towards each other.

5. Apparatus according to claim 4, in which the adjustment means comprises a stop member, the resilient means being trapped between the stop member and the second annular member, the stop member being axially adjustable with respect to the second annular member.

6. Apparatus for use in winding plastics material films onto a reusable and/or tensionable core, comprising means for receiving a bulk roll of film for rotation, means for receiving the reusable and/or tensionable core onto which the film is to be wound, and means being provided for driving the core for winding the film thereon.

7. The apparatus of claim 6, including guards for enclosing the rolls of film when the apparatus is in operation.

8. A system for handling sheet material supplied in bulk roll form, comprising a plurality of cores, an apparatus in accordance with claim 6 for winding the material from the bulk roll onto said cores in shorter lengths, and one or more dispensers for dispensing material from the cores under controlled tension.

9. A system according to claim 8, in which said cores are reusable sleeves which may be mounted on an apparatus according to claim 1 to form said dispenser.

10. A system according to claim 8, in which said cores are apparatus according to claim 1, each dispenser comprising one of said cores.

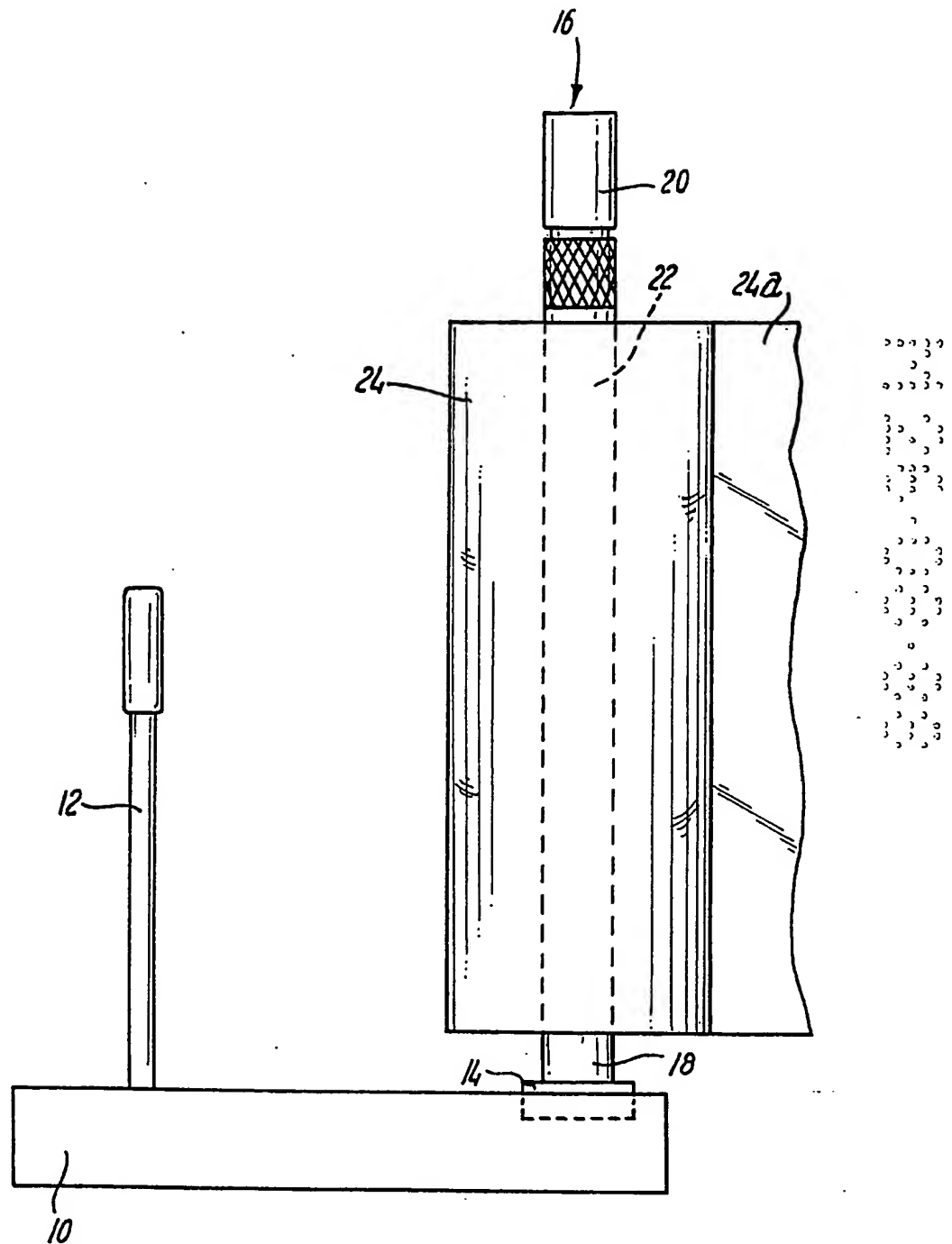


Fig. 1

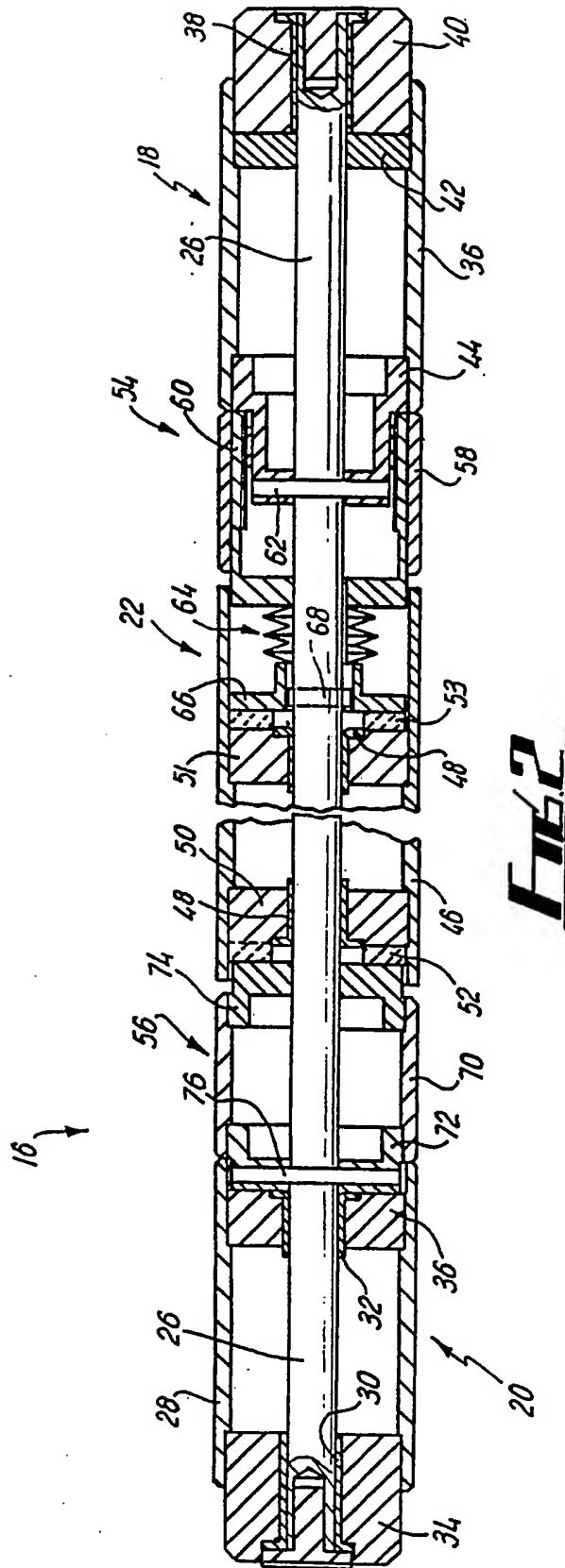


Fig. 2

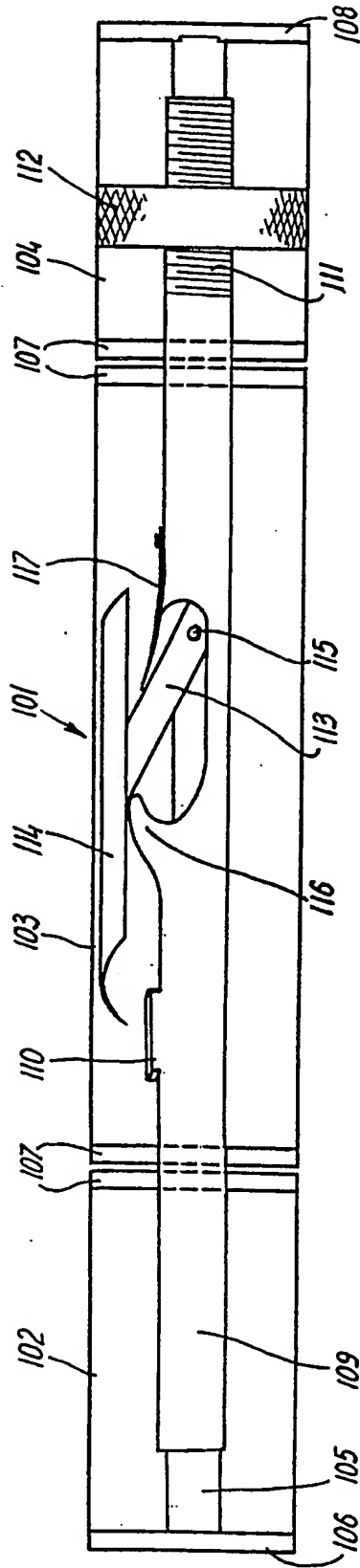


Fig. 3

111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

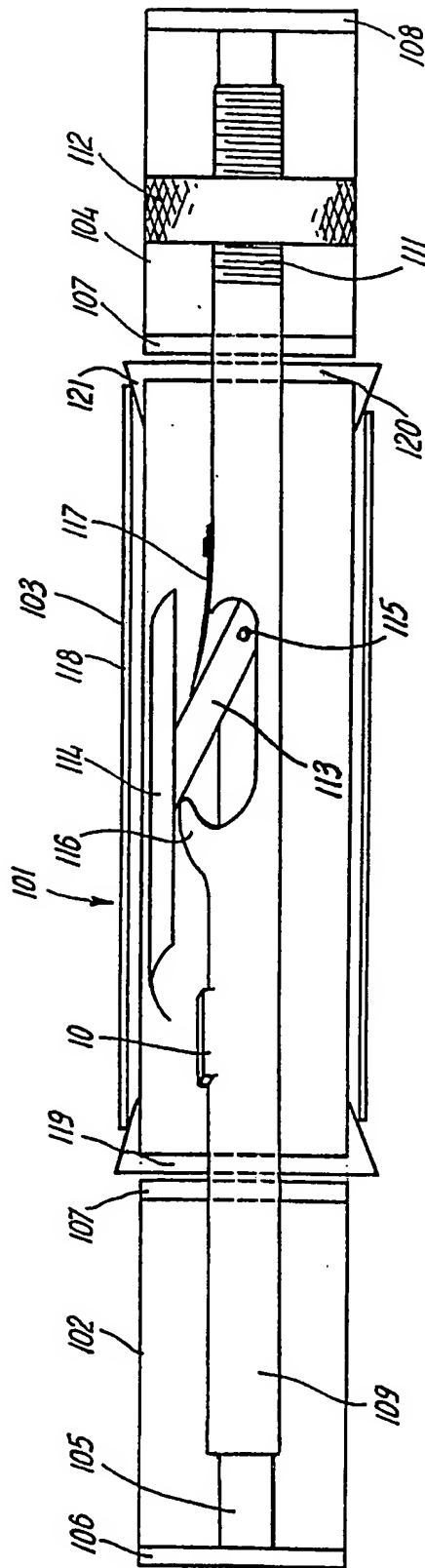


Fig. 4

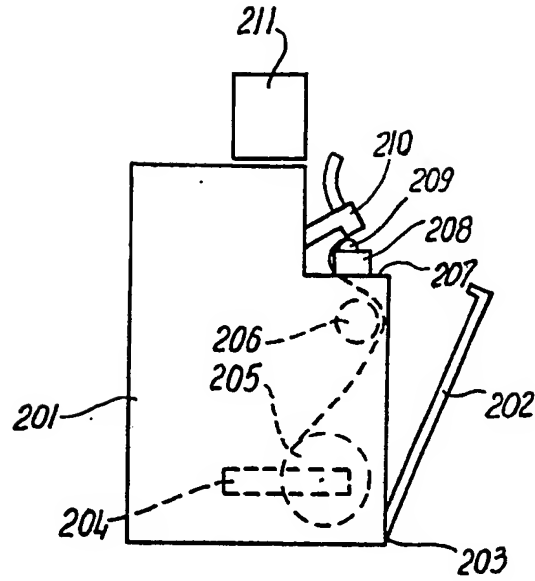


Fig. 5

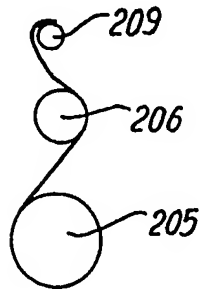


Fig. 6